

## REPORT

# Hemispheric asymmetry in ocean change and the productivity of ecosystem sentinels

W. J. Sydeman<sup>1,\*</sup>, D. S. Schoeman<sup>2,3</sup>, S. A. Thompson<sup>1</sup>, B. A. Hoover<sup>4</sup>, M. García-Reyes<sup>1</sup>, F. Daunt<sup>5</sup>, P. Agnew<sup>6</sup>, T. Anker-Nilssen<sup>7</sup>, C. Barbraud<sup>8</sup>, R. Barrett<sup>9</sup>, P. H. Becker<sup>10</sup>, E. Bell<sup>11</sup>, P. D. Boersma<sup>12</sup>, S. Bouwhuis<sup>10</sup>, B. Cannell<sup>13</sup>, R. J. M. Crawford<sup>14</sup>, P. Dann<sup>15</sup>, K. Delord<sup>8</sup>, G. Elliott<sup>16</sup>, K. E. Erikstad<sup>17</sup>, E. Flint<sup>18</sup>, R. W. Furness<sup>19</sup>, M. P. Harris<sup>5</sup>, S. Hatch<sup>20</sup>, K. Hilwig<sup>21</sup>, J. T. Hinke<sup>22</sup>, J. Jahncke<sup>23</sup>, J. A. Mills<sup>24</sup>, T. K. Reiertsen<sup>25</sup>, H. Renner<sup>21</sup>, R. B. Sherley<sup>26</sup>, C. Surman<sup>27</sup>, G. Taylor<sup>16</sup>, J. A. Thayer<sup>1</sup>, P. N. Trathan<sup>28</sup>, E. Velarde<sup>29</sup>, K. Walker<sup>16</sup>, S. Wanless<sup>5</sup>, P. Warzybok<sup>23</sup>, Y. Watanuki<sup>30</sup>

*Science* 28 May 2021:

Vol. 372, Issue 6545, pp. 980-983

DOI: 10.1126/science.abf1772

## Sampling seabirds

The vastness of the world's oceans makes them difficult to monitor. Seabirds that forage and breed across oceans globally have been recognized as sentinels of ocean health. Sydeman *et al.* looked across seabird species of both the Northern and Southern Hemispheres and found varying patterns. Northern Hemisphere species exhibited greater signs of stress and reduced breeding success, indicative of low fish resources. Southern Hemisphere species showed less impact on reproductive output, suggesting that the fish populations there have thus far been less disturbed. The differences across hemispheres indicate different strategies for conservation, with active recovery needed in the north and enhanced protection in the south.

*Science*, abf1772, this issue p. [980](#)

## Abstract

Climate change and other human activities are causing profound effects on marine ecosystem productivity. We show that the breeding success of seabirds is tracking hemispheric differences in ocean warming and human impacts, with the strongest effects on fish-eating, surface-foraging species in the north. Hemispheric asymmetry suggests the need for ocean management at hemispheric scales. For the north, tactical, climate-based recovery plans for forage fish resources are needed to recover seabird breeding productivity. In the south, lower-magnitude change in seabird productivity presents opportunities for strategic management approaches such as large marine protected areas to sustain food webs and maintain predator productivity. Global monitoring of seabird productivity enables the detection of ecosystem change in remote regions and contributes to our understanding of marine climate impacts on ecosystems.

<https://www.sciencemag.org/about/science-licenses-journal-article-reuse>